



# Riding Out Future Quakes

Ideas for Action

***Improving Planning of Transportation Providers,  
Governments, Utilities and Businesses for  
Post-Earthquake Transportation Disruptions  
in the San Francisco Bay Region***

***Proceedings of Five Subregional Workshops in  
October and November 1998***

**MARCH 1999**

**ASSOCIATION OF BAY AREA GOVERNMENTS**

# Riding Out Future Quakes

Ideas for Action

***Improving Planning of Transportation Providers,  
Governments, Utilities and Businesses for  
Post-Earthquake Transportation Disruptions  
in the San Francisco Bay Region***

*Proceedings of Five Subregional Workshops in  
October and November 1998*

**MARCH 1999**

**ASSOCIATION OF BAY AREA GOVERNMENTS**

Mailing Address: P.O. Box 2050 -- Oakland, CA 94604-2050

Location: Joseph P. Bort MetroCenter -- Eighth and Oak Streets -- Oakland

Phone: (510) 464-7900 -- Fax: (510) 464-7979

Internet Access through abagOnline at <http://quake.abag.ca.gov>

Publication Number: P99001EQK

# CREDITS ...

## Report Authors:

Jeanne B. Perkins – Earthquake Program Manager, Association of Bay Area Governments  
Ian O'Donnell – Research Assistant, Association of Bay Area Governments  
Robert Swierk – Research Assistant, Association of Bay Area Governments  
Edward Wyatt – Environmental Engineer, Assoc. of Bay Area Governments

## ABAG Management:

Eugene Y. Leong -- Executive Director  
Gary Binger -- Deputy Executive Director/Planning Director

## Acknowledgments:

ABAG would like to acknowledge the efforts of the following members of the Review Committee in reviewing the material which forms a basis for this document.

## Earthquakes and Transportation Recovery Review Committee:

Mary Griffin – Committee Chair -- Supervisor, San Mateo County  
John Boatwright – Geophysicist, U.S. Geological Survey  
Dean Bullert – United Parcel Service  
Don Erba – Water Utility Maintenance Supervisor, Santa Clara Valley Water District  
Scott Grago/Chris Salkeld – Emergency Preparedness and Disaster Recovery, Pacific Bell  
Robert Lau/David Lee – East Bay Municipal Utilities District  
Cynthia MacLeay – California Department of Transportation, Structures Dept.  
Eli R. Molina – California Highway Patrol  
Sarah Nathe/LaVange Guinn– Earthquake Program, Calif. Office of Emergency Services  
Mark O'Brien– Environmental Health and Safety Compliance, Port of Oakland  
Nancy Okasaki/Jeff Georgevich–Metropolitan Transportation Commission  
Chan Newlander – Calif. Dept. of Transportation, District 4, Traffic Systems  
Doug Sandy – Assistant Director, Disaster Services, American Red Cross–Bay Area  
William U. "Woody" Savage – Geosciences Department, Pacific Gas and Electric Co.  
Myron Steele – Golden Gate Transit

The writing and production of this report was financed by a creative partnership of public and private organizations, including:



**ABAG** ASSOCIATION  
OF BAY AREA  
GOVERNMENTS



*Pacific Gas and  
Electric Company*

**PACIFIC  BELL**

The effort was supported, in part, by the National Earthquake Hazards Reduction Program of the Federal Emergency Management Agency (FEMA), through funding from the California Governor's Office of Emergency Services Earthquake Program. Any opinions, findings, conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the funding agencies.

# TABLE OF CONTENTS ...

<b>BACKGROUND AND OBJECTIVES</b>	<b>Page</b> <b>iv</b>
<b>PART I – The Problem – Why Worry About Transportation Disruptions Following Future Earthquakes in the San Francisco Bay Area</b>	<b>Problem</b> <b>1</b>
<b>PART II – Discussion Questions – Initiating a Discussion on Planning for Transportation Disruptions Following Future Earthquakes in the San Francisco Bay Area</b>	<b>Questions</b> <b>1</b>
<b>PART III – Innovative Perspectives - Planning for Transportation Disruptions Following Future Earthquakes in the San Francisco Bay Area</b>	<b>Perspectives</b> <b>1</b>
Post-Earthquake Transportation: Dilemmas for Emergency Management	<b>2</b>
Transportation in Disasters: The Sonoma County Experience	<b>4</b>
Transportation in Disasters: The City of Napa Experience	<b>6</b>
Transportation in Disasters: The City of Oakland Experience	<b>7</b>
Impact of Earthquakes on the City of San Jose's Infrastructure	<b>8</b>
Transportation in Disasters: The City of San Francisco Experience	<b>10</b>
The Impact of Transportation Disruptions on Mass Care: Some Perspectives of the Red Cross	<b>11</b>
The Impact of Earthquakes on an Airport: Some Experiences and Planning by the San Jose Intl. Airport	<b>12</b>
San Francisco Bay Area Earthquake Airlift Volunteers: A Special Project of the California Pilots Assoc.	<b>13</b>
Transportation After Earthquakes: The Role of the California Department of Transportation (Caltrans)	<b>14</b>
Transportation in Disasters: A Perspective of the California Highway Patrol	<b>16</b>
Bus Transportation Issues Resulting From the Loma Prieta Earthquake	<b>18</b>
Earthquakes Disrupt Communications Along With Transportation	<b>20</b>
Gas and Electric Utility Needs for Post-Earthquake Transportation	<b>22</b>
The Chevron Emergency Communications and Rally Plan	<b>23</b>
UPS: Moving Goods Following Earthquakes	<b>25</b>
Lessons from Loma Prieta: Corporate Transportation Issues	<b>27</b>
<b>PART IV – Checklist - Recommended Actions to Plan for Transportation Disruptions Following Future Earthquakes in the San Francisco Bay Area</b>	<b>Checklist</b> <b>1</b>
General Checklist for All Employers – Both Private Companies and Government Agencies	<b>2</b>
Residents Checklist	<b>4</b>
Transportation Providers Checklist	<b>6</b>
Utilities Checklist	<b>8</b>
Private Emergency Service Providers Checklist	<b>9</b>
Local and State Government Checklist	<b>10</b>
Private Business and Industry Checklist	<b>13</b>
School and Day Care Provider Checklist	<b>14</b>
<b>APPENDIX A – Peninsula-Golden Gate Earthquake Scenario Earthquake</b>	
<b>APPENDIX B – Reverse Faults in the Western Santa Clara Valley – The Foothills Fault System</b>	

## BACKGROUND AND OBJECTIVES ...

This report builds on a major report on the vulnerability of the region's transportation system to earthquakes published by ABAG (***Riding Out Future Quakes***, October 1997, Perkins and others).

The ***Riding Out Future Quakes*** project was initiated by ABAG and Caltrans following the Northridge and Loma Prieta earthquakes for two principal reasons.

1. We are concerned about transportation problems immediately after earthquakes because emergency responders need to use transportation systems.
2. We now have an increased understanding of the role that transportation system disruptions can have on a region's economy for months, if not years.

As a second step in the planning process, ABAG held a series of five subregional workshops discussing hypothetical road and rail closures resulting from selected scenario earthquakes in October and November 1998. "Tabletop" disaster drills and extensive discussion led to identification of the major issues, interagency dependencies, and areas of potential conflict likely to face transportation providers, governments, utilities and businesses as they struggle to address the transportation impacts after a large earthquake.

***Although this report is the Proceedings of those workshops, we hope that it will serve to inspire innovative planning for minimizing transportation disruption following future earthquakes on the part of both workshop participants and others.***

The current seismic retrofit program of Caltrans currently focuses on the retrofit of bridges and highway structures to prevent collapse. These structures have been retrofitted to minimize the likelihood of collapse and to prevent fatalities and injuries, but may still be closed for a period of time for repair of any damages.

The Loma Prieta and Northridge earthquakes served notice that we need to identify what is likely to be the surviving portion of our transportation system. Since Northridge, Caltrans has been working on adopting a system of lifeline routes that would facilitate movement between major staging areas and impacted areas following major earthquakes. For example, the Stockton and Tracy areas may serve as such staging areas for getting emergency supplies into an impacted San Francisco Bay region. In such a case, I-580 becomes critical. The results of this effort can also serve as analysis or programming tools for identifying future improvement needs for highway structures.

In the Bay Area, Caltrans, the Metropolitan Transportation Commission (MTC) and the county congestion management agencies (CMAs) continue to work cooperatively to identify routes that are critical for life safety and emergency response, to examine routes that serve major roles in the economic recovery of the Bay Area, and to evaluate performance level needs for these routes and their structures.

At the same time, MTC is continuing to lead the effort to develop an integrated Trans Response Plan (TRP) for earthquakes which encompasses all modes of available transportation. This effort coordinates the activities of MTC, Caltrans, State and local Offices of Emergency Services, and transportation providers.

